

Claims:

1.

An ink flow control device for a printer having at least one print head, comprising:

a main body;

an ink flow passage formed at least in part in the main body and communicating a supply of ink with a print head;

a diaphragm carried by the main body and defining at least part of a pressure receiving chamber on one side of the diaphragm that forms part of the ink flow passage and a reference chamber on the other side of the diaphragm, a portion of the diaphragm being movable in generally opposed directions tending to increase and decrease the volume of the pressure receiving chamber in response to a differential force across the diaphragm;

a valve including a valve seat with a bore defining a portion of the ink flow passage, a valve head movable relative to and selectively engageable with the valve seat to at least substantially restrict ink flow through the bore when the valve head is engaged with the valve seat and to permit ink flow through the bore when the valve head is not engaged with the valve seat, the valve head being moved relative to the valve seat by movement of the diaphragm to control ink flow through the ink flow passage at least in part by the movement of the diaphragm.

2.

The ink flow control device of claim 1 wherein the valve includes a valve stem coupled at one end to the diaphragm, extending through the bore of the valve seat and coupled to the valve head so that the valve head and diaphragm are on opposed sides of the valve seat.

3.

The ink flow control device of claim 1 further comprising a spring providing a force on the diaphragm to yieldably bias the diaphragm in a first direction.

4.

The ink flow control device of claim 3 wherein the spring is disposed in the reference chamber.

5.

The ink flow control device of claim 4 further comprising an adjustable member carried by the main body and being movable to vary the spring force acting on the diaphragm.

6.

The ink flow control device of claim 5 wherein the adjustable member is threadedly carried by the main body so that it engages one end of the spring

and can be advanced and retracted to change the spring force acting on the diaphragm.

7.

The ink flow control device of claim 3 wherein the spring is disposed in the pressure receiving chamber and yieldably biases the diaphragm in a direction tending to increase the volume of the pressure receiving chamber.

8.

The ink flow control device of claim 2 which also comprises a spring disposed around the valve stem in the pressure receiving chamber to yieldably bias the diaphragm in a direction increasing the volume of the pressure receiving chamber.

9.

The ink flow control device of claim 4 which also comprises a spring disposed in the pressure receiving chamber and yieldably biasing the diaphragm with the force of the spring in the pressure receiving chamber tending to offset at least in part the force applied to the diaphragm by the spring in the reference chamber.

10.

The ink flow control device of claim 1 which also comprises a filter carried by the main body and having an inner ring bounding the filter area and

an outer ring spaced from the inner ring and connected to the inner ring by a connecting piece.

11.

The ink flow control device of claim 10 wherein the main body includes a first base plate and a second base plate with the filter trapped between the first base plate and second base plate so that the outer ring provides an air-tight seal between the first base plate and second base plate.

12.

The ink flow control device of claim 11 wherein the inner ring is trapped between the first base plate and the second base plate to locate the filter relative to the first base plate and second base plate.

13.

The ink flow control device of claim 10 wherein the filter is oblong.

14.

The ink flow control device of claim 10 wherein the filter is disposed upstream of the valve.

15.

The ink flow control device of claim 1 wherein the pressure receiving chamber is disposed between the end of the ink flow passage communicated

with the print head and the valve seat so that pressure changes at said end of the ink flow passage communicated with the print head are communicated to the pressure receiving chamber even if the valve head is engaged with the valve seat.

16.

The ink flow control device of claim 15 wherein a decrease in pressure in the pressure receiving chamber causes the diaphragm to move in a direction reducing the volume of the pressure receiving chamber to move the valve head away from the valve seat and permit ink flow through the bore of the valve seat.

17.

The ink flow control device of claim 1 which also comprises a hole in the main body communicating the reference chamber with the ambient environment.

18.

An ink flow control device for a printer having at least one print head, comprising:

a main body;

an ink flow passage formed at least in part in the main body and communicating a supply of ink with a print head;

a diaphragm carried by the main body and defining at least part of a pressure receiving chamber on one side of the diaphragm that forms part of the ink flow passage and a reference chamber on the other side of the diaphragm, a portion of the diaphragm being movable in generally opposed directions tending to increase and decrease the volume of the pressure receiving chamber in response to a differential force across the diaphragm; and

a valve controlling the flow of ink through the ink flow passage to the print head and operably connected to the diaphragm for movement by the diaphragm to permit ink flow to the print head when the print head is operating to discharge ink for printing and to at least substantially restrict ink flow when the print head is not printing in response to changes in pressure produced by operation of the print head and applied through the ink to the diaphragm.